

Patent & Utility Model Concordance

MENU

SEARCH

NEWS

HELP

Document Number list

	1	2	3	4	5
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CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION  
TECHNICAL PROBLEM MEANS OPERATION EXAMPLE DESCRIPTION OF DRAWINGS DRAWINGS

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CLAIMS

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[Utility model registration claim]

[Claim 1] The flange of a contact plate is pinched between the opening edge of a tubed sensor component made to overlook while exhausting the edge by the side of lock out, and the end face of a tubed isolation bush. In the oxygen sensor which has the structure which connected with the external lead harness the point of the terminal which is connected to this contact plate and penetrates the inside of said isolation bush While making it the abbreviation center section of said terminal crooked and making the crowning of this flection contact the inner skin of said isolation bush The oxygen sensor of the internal combustion engine characterized by carrying out insertion immobilization at the through tube in which the point of a terminal was prepared at the edge of the opposite side with the contact plate contact side of said isolation bush.

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DETAILED DESCRIPTION

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[Detailed explanation of a design]

[0001]

[Industrial Application]

Especially this design is related with the structure of the oxygen sensor which measures the air-fuel ratio of the gaseous mixture which equips an internal combustion engine's exhaust pipe and is supplied to this engine, and the oxygen density under exhaust air which has a close relation about an internal combustion engine's oxygen sensor, and is used for offer of the feedback signal in feedback control of air-fuel ratio.

[0002]

[Description of the Prior Art]

An oxygen sensor makes the sensor component which consists of a zirconia etc. face during an engine's exhaust air, takes out the electromotive force generated based on the ratio of the oxygen density in atmospheric air (regularity), and the oxygen density under exhaust air, detects by this the air-fuel ratio of the gaseous mixture inhaled by the engine through the oxygen density under exhaust air, and is used for feedback control of air-fuel ratio (reference, such as JP,63-41761,U).

[0003]

As this conventional kind of an oxygen sensor, there is a thing as shown in drawing 3, for example.

That is, as shown in drawing, this thing makes the point of the electrode holder 1 attached in the engine exhaust pipe wall E stop the end face section of the zirconia tube 2, and has covered the point by which this zirconia tube 2 was blockaded by the protector 3 with slit 3a.

And in the opening edge of the zirconia tube 2, the contact plate 4 which is a conductor is contacted, this contact plate 4 is pressed by the apical surface of the tubed isolation bush 5, and the isolation bush 5 is fixed to the electrode holder 1 through the pan spring 7 with the covering 6 which carried out fastening immobilization.

[0004]

And it \*\*\*\*(ed) in the rubber tube 10 by which carries out sticking-by-pressure immobilization of the lead wire 9 in the terminal 8 which stands in a row on the contact plate 4, and extends in the isolation bush 5, and fastening immobilization is carried out with the covering 6 equipped with this lead wire 9 in the hole of the end face section of the isolation bush 5, and was drawing outside.

[0005]

[Problem(s) to be Solved by the Device]

However, the terminal 8 of this oxygen sensor Since there was no operation which makes the force buffer to the external force which is in a free condition between the contact plate 4 and the rubber tube 10, and acts in the direction of an axis of abscissa (the direction of a path) The weld zone which external force acts by vibration of a car and is connected with the end of a terminal 8 and the terminal of a lead harness broke, or the weld zone of a terminal 8 and the contact plate 4 broke, and there was a trouble that the dependability of an oxygen sensor was spoiled.

[0006]

Moreover, in the attachment activity of components, since said both each part articles were not being fixed in the free condition, the terminal 8 grade fell and there was a trouble that the efficiency of an activity with a group was bad. Then, while this design is made in view of this conventional trouble, prevents the crack of the connection part of the terminal terminal by vibration of a car and raises the dependability of an oxygen sensor, it aims at offering the oxygen

sensor of the internal combustion engine which can raise the working capacity at the time of with a components group.  
[0007]

[Means for Solving the Problem]

For this reason, this design pinches the flange of a contact plate between the opening edge of a tubed sensor component made to overlook while exhausting the edge by the side of lock out, and the end face of a tubed isolation bush. In the oxygen sensor which has the structure which connected with the external lead harness the point of the terminal which is connected to this contact plate and penetrates the inside of said isolation bush While making it the abbreviation center section of said terminal crooked and making the crowning of this flection contact the inner skin of said isolation bush The point of a terminal is considered as the configuration which carried out insertion immobilization with the contact plate contact side of said isolation bush at the through tube in which it was prepared at the edge of the opposite side.

[0008]

[Function]

While according to this configuration making it the abbreviation center section of the terminal crooked and making the crowning of this flection contact the inner skin of said isolation bush By carrying out insertion immobilization, to the through tube in which the point of a terminal was prepared at the edge of the opposite side with the contact plate contact side of said isolation bush The external force which can give spring nature to a terminal, and can be made to buffer in this spring part to the external force which acts on a longitudinal direction (the direction of a path), therefore acts on each connection with a terminal is eased, with this connection is not damaged.

[0009]

Moreover, since the terminal is being fixed to the isolation bush in the spring part, it does not fall at the time of with a group, and improvement in the efficiency in a components attachment activity is achieved.

[0010]

[Example]

One example of this design is explained based on a drawing below.

In drawing 1, the sensor component 11 has covered point 11a which nothing and its pars intermedia 11b are held [ a ] at an electrode holder 12, and makes tubed [ which had the end blockaded ] face during exhaust air by the protector 13 which has slit 13a. And caulking immobilization of the protector 13 is carried out at the electrode holder 12.

[0011]

Moreover, while back end section (opening side edge section) 11c of the sensor component 11 is covered with an electrode holder 12 through the isolation bushes 15 and 16 with the tubed cap 14 by which caulking immobilization was carried out and it protects the end, the sensor output terminal 17 is connected to this back end section 11c, and the end of the lead harness 18 is connected to the point.

[0012]

And as shown in drawing 2, the sensor output terminal 17 consists of a contact plate 19 and a terminal 20, and the end of the terminal 20 which made abbreviation pars intermedia crooked is connected to the peripheral face of the hat-like contact plate 19 by welding.

And back end section 11c of the sensor component 11 and flange 19a of the contact plate 19 were made to carry out press contact within the isolation bush 15 and 16 by the lower limit of the isolation bush 15, and the crowning of flection 20a of a terminal 20 is in contact with inner skin 16a of the isolation bush 16. And insertion immobilization is carried out at through tube 16b prepared in the end face of the isolation bush 16, and point 20b of a terminal 20 is constituted so that spring nature may make it give a terminal 20.

[0013]

The original form of a terminal 20 is formed here so that the point 20b may open and incline outside to the axis O by the side of the contact plate 19, as shown in drawing 2. Therefore, since it is inserted in with [ of components ] a group when point 20b makes it deform into through tube 16b of the isolation bush 16 to Axis O side, spring nature is given to a terminal 20, and in the A point and B point of drawing 1, it is F1 and F2. The force will act.

[0014]

Fitting of another isolation bush 16 is carried out to the upper limit of the isolation bush 15 from a top, and these isolation bushes 15 and 16 are further fixed to it through the pan spring 21 at the end face periphery of an electrode holder 12 with the cylinder-like cap 14 which carried out caulking immobilization.

And the lead harness 17 by which sticking-by-pressure connection was made in point 20b of the terminal 20 projected

from through tube 16b of the isolation bush 16 and an end is drawn outside through the hole of the rubber 22 in which the other end was prepared by the back end section of cap 14.

[0015]

In addition, in an oxygen sensor, they are actually about 300 m/s<sup>2</sup> by vibration of a car. Although acceleration will be applied, insurance is seen here, and they are about 1000 m/s<sup>2</sup>. Since the weight of the sensor output terminal 16 is about 1g supposing it starts  $2 = 1\text{N}$  of  $0.001\text{kg} \times 1000\text{ m/s}^2$  The force will act on the sensor output terminal 17.

[0016]

Therefore, the elastic force of the spring which can make this external force ease is given to the terminal 20 of the sensor output terminal 17.

Thus, since it can be made to buffer in this spring part to the external force which gives spring nature to a terminal 20 and acts on the longitudinal direction based on vibration of a car, While the external force which acts on each connection with a terminal 20 can be eased, and this connection cannot be damaged, with being able to raise the dependability of an oxygen sensor In order not to fall at the time of with a group by fixing a terminal 20 to the isolation bush 16 in a spring part, improvement in the efficiency in a components attachment activity is achieved.

[0017]

[Effect of the Device]

While according to this design making it the abbreviation center section of the terminal crooked and making the crowning of this flection contact the inner skin of an isolation bush as explained above By carrying out insertion immobilization of the point of a terminal at the through tube of an isolation bush Since the external force which can give spring nature to a terminal, and can be made to buffer in this spring part to the external force which acts on a longitudinal direction, therefore acts on each connection with a terminal is eased, with this connection is not damaged, the dependability of an oxygen sensor can be raised.

[0018]

Moreover, in order to make it possible to fix a terminal to an isolation bush in a spring part and not to fall at the time of with a group, improvement in the efficiency in a components attachment activity is achieved.

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[Translation done.]

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TECHNICAL FIELD

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[Industrial Application]

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[0002]

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PRIOR ART

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## [Description of the Prior Art]

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As this conventional kind of an oxygen sensor, there is a thing as shown in drawing 3, for example. That is, as shown in drawing, this thing makes the point of the electrode holder 1 attached in the engine exhaust pipe wall E stop the end face section of the zirconia tube 2, and has covered the point by which this zirconia tube 2 was blockaded by the protector 3 with slit 3a.

And in the opening edge of the zirconia tube 2, the contact plate 4 which is a conductor is contacted, this contact plate 4 is pressed by the apical surface of the tubed isolation bush 5, and the isolation bush 5 is fixed to the electrode holder 1 through the pan spring 7 with the covering 6 which carried out fastening immobilization.

[0004]

And it \*\*\*\*(ed) in the rubber tube 10 by which carries out sticking-by-pressure immobilization of the lead wire 9 in the terminal 8 which stands in a row on the contact plate 4, and extends in the isolation bush 5, and fastening immobilization is carried out with the covering 6 equipped with this lead wire 9 in the hole of the end face section of the isolation bush 5, and was drawing outside.

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**EFFECT OF THE INVENTION**

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**[Effect of the Device]**

While according to this design making it the abbreviation center section of the terminal crooked and making the crowning of this flecion contact the inner skin of an isolation bush as explained above By carrying out insertion immobilization of the point of a terminal at the through tube of an isolation bush Since the external force which can give spring nature to a terminal, and can be made to buffer in this spring part to the external force which acts on a longitudinal direction, therefore acts on each connection with a terminal is eased, with this connection is not damaged, the dependability of an oxygen sensor can be raised.

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Moreover, in order to make it possible to fix a terminal to an isolation bush in a spring part and not to fall at the time of with a group, improvement in the efficiency in a components attachment activity is achieved.

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**TECHNICAL PROBLEM**

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[Problem(s) to be Solved by the Device]

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[0007]

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**MEANS**

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**[Means for Solving the Problem]**

For this reason, this design pinches the flange of a contact plate between the opening edge of a tubed sensor component made to overlook while exhausting the edge by the side of lock out, and the end face of a tubed isolation bush. In the oxygen sensor which has the structure which connected with the external lead harness the point of the terminal which is connected to this contact plate and penetrates the inside of said isolation bush While making it the abbreviation center section of said terminal crooked and making the crowning of this flection contact the inner skin of said isolation bush The point of a terminal is considered as the configuration which carried out insertion immobilization with the contact plate contact side of said isolation bush at the through tube in which it was prepared at the edge of the opposite side.  
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OPERATION

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[Function]

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[0009]

Moreover, since the terminal is being fixed to the isolation bush in the spring part, it does not fall at the time of with a group, and improvement in the efficiency in a components attachment activity is achieved.

[0010]

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**EXAMPLE**

---

[Example]

One example of this design is explained based on a drawing below.

In drawing 1 , the sensor component 11 has covered point 11a which nothing and its pars intermedia 11b are held [ a ] at an electrode holder 12, and makes tubed [ which had the end blockaded ] face during exhaust air by the protector 13 which has slit 13a. And caulking immobilization of the protector 13 is carried out at the electrode holder 12.

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Moreover, while back end section (opening side edge section) 11c of the sensor component 11 is covered with an electrode holder 12 through the isolation bushes 15 and 16 with the tubed cap 14 by which caulking immobilization was carried out and it protects the end, the sensor output terminal 17 is connected to this back end section 11c, and the end of the lead harness 18 is connected to the point.

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Fitting of another isolation bush 16 is carried out to the upper limit of the isolation bush 15 from a top, and these isolation bushes 15 and 16 are further fixed to it through the pan spring 21 at the end face periphery of an electrode holder 12 with the cylinder-like cap 14 which carried out caulking immobilization.

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[0016]

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and acts on the longitudinal direction based on vibration of a car, While the external force which acts on each connection with a terminal 20 can be eased, and this connection cannot be damaged, with being able to raise the dependability of an oxygen sensor In order not to fall at the time of with a group by fixing a terminal 20 to the isolation bush 16 in a spring part, improvement in the efficiency in a components attachment activity is achieved.  
[0017]

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] The sectional view showing one example of the oxygen sensor of the internal combustion engine concerning this design.

[Drawing 2] For (a), the front view showing the sensor output terminal of drawing 1 and (b) are the bottom view of (a).

[Drawing 3] The sectional view showing an example of the conventional internal combustion engine's oxygen sensor.

[Description of Notations]

- 11 Sensor Component
- 11c Back end section
- 12 Electrode Holder
- 13 Protector
- 14 Cap
- 15 16 Isolation bush
- 16a Inner skin
- 16b Through tube
- 17 Sensor Output Terminal
- 18 Lead Harness
- 19 Contact Plate
- 19a Flange
- 20 Terminal
- 20a Flection
- 20b Point
- 21 Pan Spring
- 22 Rubber

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[Translation done.]

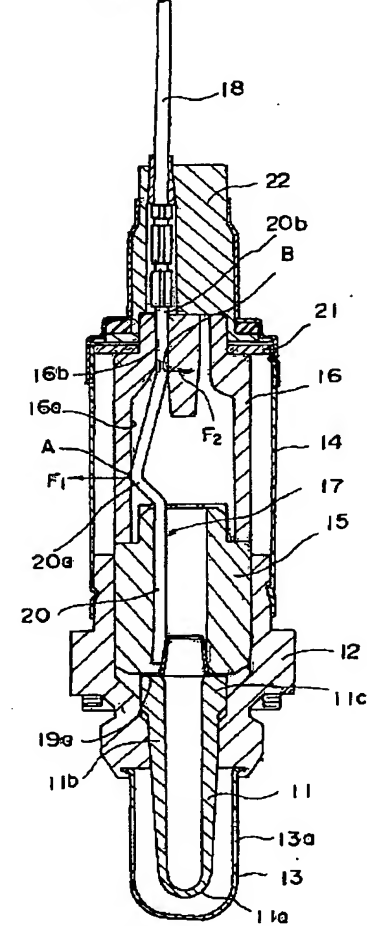
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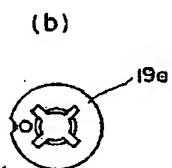
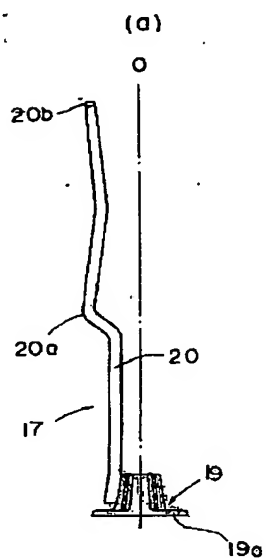
DRAWINGS

[Drawing 1]

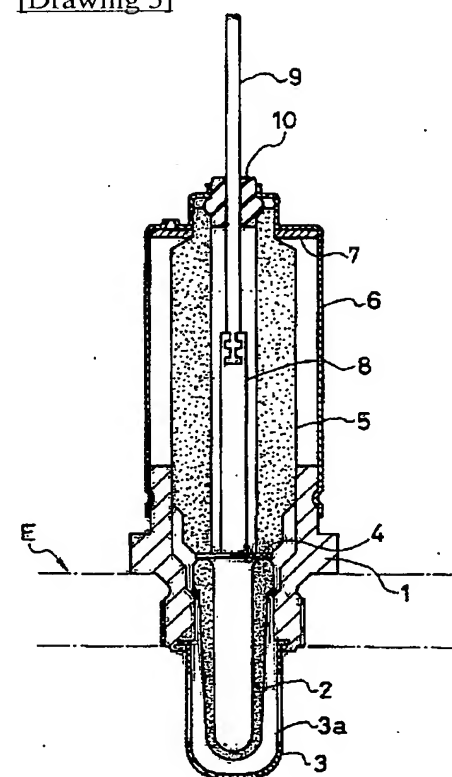


[Drawing 2]





[Drawing 3]



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[Translation done.]



## 【実用新案登録請求の範囲】

【請求項 1】 閉塞側の端部を排気中に臨ませた筒状センサ素子の開口端と筒状のアイソレーションブッシュの端面との間にコンタクトプレートのフランジを挟持し、該コンタクトプレートに接続されて前記アイソレーションブッシュの内側を貫通するターミナルの先端部を外部のリードハーネスと接続した構造を有する酸素センサにおいて、

前記ターミナルの略中央部を屈曲せしめ、該屈曲部の頂部を前記アイソレーションブッシュの内周面に当接させると共に、ターミナルの先端部を前記アイソレーションブッシュのコンタクトプレート接触側とは反対側の端部に設けられた貫通孔に挿入固定したことを特徴とする内燃機関の酸素センサ。

## 【図面の簡単な説明】

【図 1】 本考案に係る内燃機関の酸素センサの一実施例を示す断面図。

【図 2】 (a) は、図 1 のセンサ出力端子を示す正面図、(b) は、(a) の底面図。

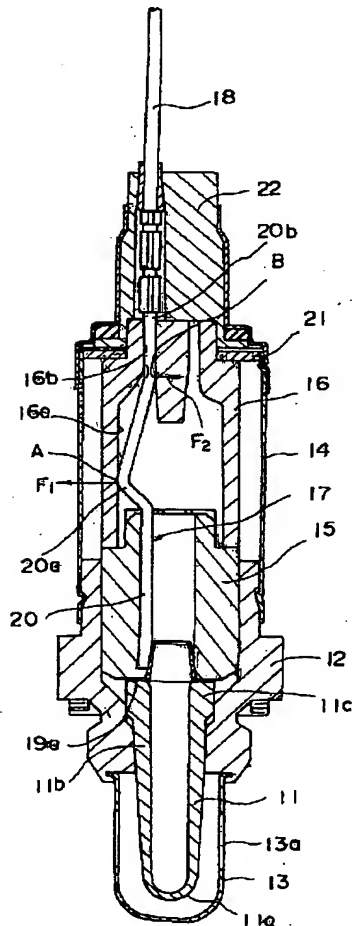
【図 3】 従来の内燃機関の酸素センサの一例を示す断

面図。

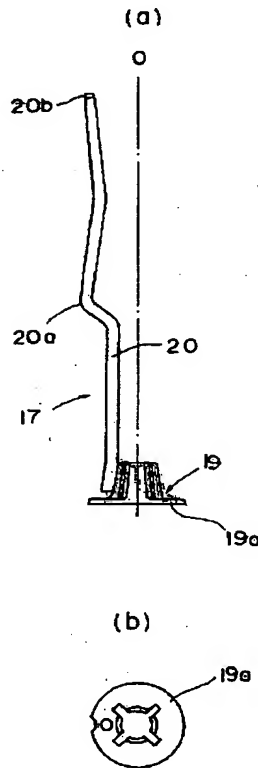
## 【符号の説明】

- 1 1 センサ素子
- 1 1 c 後端部
- 1 2 ホルダー
- 1 3 プロテクタ
- 1 4 キャップ
- 1 5、1 6 アイソレーションブッシュ
- 1 6 a 内周面
- 1 6 b 貫通孔
- 1 7 センサ出力端子
- 1 8 リードハーネス
- 1 9 コンタクトプレート
- 1 9 a フランジ
- 2 0 ターミナル
- 2 0 a 屈曲部
- 2 0 b 先端部
- 2 1 皿パネ
- 2 2 ラバー

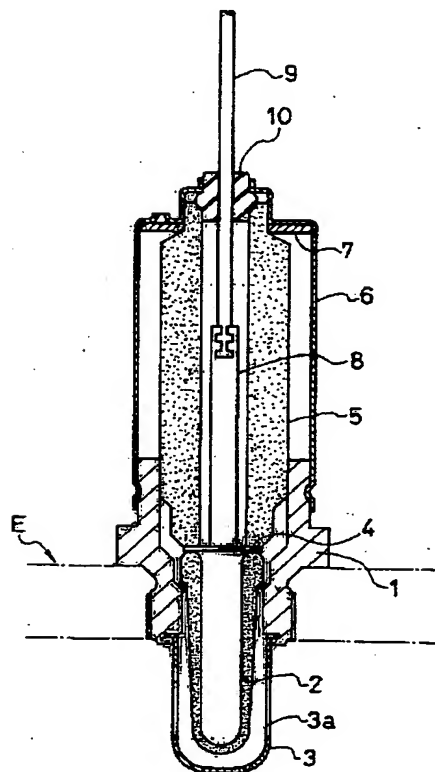
【図 1】



【図 2】



【図 3】



## 【考案の詳細な説明】

## 【0001】

## 【産業上の利用分野】

本考案は、内燃機関の酸素センサに関し、特に内燃機関の排気管に装着して該機関に供給される混合気の空燃比と密接な関係にある排気中の酸素濃度を測定し空燃比フィードバック制御におけるフィードバック信号の提供に用いる酸素センサの構造に関する。

## 【0002】

## 【従来の技術】

酸素センサは、ジルコニア等よりなるセンサ素子を機関の排気中に臨ませて、大気中の酸素濃度（一定）と排気中の酸素濃度との比に基づいて発生する起電力を取り出し、これにより、排気中の酸素濃度を介して機関に吸入される混合気の空燃比を検出するもので、空燃比フィードバック制御に用いられている（実開昭63-41761号公報等参照）。

## 【0003】

従来のこの種の酸素センサとしては、例えば、図3に示すようなものがある。

即ち、このものは、図に示すように、機関排気管壁Eに取り付けられるホルダー1の先端部にジルコニアチューブ2の基端部を係止させ、このジルコニアチューブ2の閉塞された先端部をスリット3a付のプロテクタ3により覆ってある。

そして、ジルコニアチューブ2の開口端には、導電体であるコンタクトプレート4を接触させてあり、該コンタクトプレート4は、筒状のアイソレーションブッシュ5の先端面で押圧してあり、アイソレーションブッシュ5は、ホルダー1に加締固定したカバー6で皿バネ7を介して固定してある。

## 【0004】

そして、コンタクトプレート4に連なってアイソレーションブッシュ5内に延びるターミナル8にリード線9を圧着固定し、このリード線9をアイソレーションブッシュ5の基端部の孔内に装着されるカバー6により加締固定されるラバーチューブ10に引通して外部に導出していた。

## 【0005】

## 【 考 案 が 解 決 し よ う と す る 課 題 】

しかし、かかる酸素センサのターミナル 8 は、コンタクトプレート 4 とラバーチューブ 1 0 との間でフリーの状態にあり、横軸方向（径方向）に作用する外力に対して、力を緩衝させる作用がなかったので、車両の振動により外力が作用してターミナル 8 の一端とリードハーネスの端子と接続される溶接部が割れたり、ターミナル 8 とコンタクトプレート 4 との溶接部が割れ、酸素センサの信頼性が損なわれるといった問題点があった。

## 【 0 0 0 6 】

また、部品の組付け作業においては、前記各部品相互がフリーの状態に固定されていないためターミナル 8 等が落下して組付け作業の能率が悪いといった問題点があった。

そこで、本考案はかかる従来の問題点に鑑みなされたものであり、車両の振動によるターミナル端子の接続部分の割れを防止して酸素センサの信頼性を向上させると共に、部品組付け時の作業能率を向上させることができる内燃機関の酸素センサを提供することを目的とする。

## 【 0 0 0 7 】

## 【 課 題 を 解 決 す る た め の 手 段 】

このため、本考案は、閉塞側の端部を排気中に臨ませた筒状センサ素子の開口端と筒状のアイソレーションブッシュの端面との間にコンタクトプレートのフランジを挟持し、該コンタクトプレートに接続されて前記アイソレーションブッシュの内側を貫通するターミナルの先端部を外部のリードハーネスと接続した構造を有する酸素センサにおいて、前記ターミナルの略中央部を屈曲せしめ、該屈曲部の頂部を前記アイソレーションブッシュの内周面に当接させると共に、ターミナルの先端部を前記アイソレーションブッシュのコンタクトプレート接触側とは反対側の端部に設けられた貫通孔に挿入固定した構成とする。

## 【 0 0 0 8 】

## 【 作 用 】

かかる構成によれば、ターミナルの略中央部を屈曲せしめ、該屈曲部の頂部を前記アイソレーションブッシュの内周面に当接させると共に、ターミナルの先端

部を前記アイソレーションブッシュのコンタクトプレート接触側とは反対側の端部に設けられた貫通孔に挿入固定することにより、ターミナルにバネ性を持たせ、横方向（径方向）に作用する外力に対して該バネ部分で緩衝させることができ、したがって、ターミナルとの各接続部に作用する外力が緩和され、以て、該接続部が破損することがない。

#### 【 0 0 0 9 】

また、ターミナルはバネ部分でアイソレーションブッシュに固定されているので、組付時に落下することがなく、部品組付け作業における能率の向上が図られる。

#### 【 0 0 1 0 】

##### 【 実施例 】

以下に本考案の一実施例を図面に基づいて説明する。

図1において、センサ素子11は、一端を閉塞された筒状をなし、その中間部11bはホルダー12に保持され、排気中に臨ませる先端部11aをスリット13aを有するプロテクタ13によって覆っている。そして、プロテクタ13は、ホルダー12にかしめ固定されている。

#### 【 0 0 1 1 】

また、センサ素子11の後端部（開口側端部）11cは、ホルダー12にその一端をカシメ固定された筒状のキャップ14によりアイソレーションブッシュ15、16を介して覆われて保護されると共に、該後端部11cには、センサ出力端子17が接続され、その先端部にはリードハーネス18の一端が接続されている。

#### 【 0 0 1 2 】

そして、図2に示すように、センサ出力端子17は、コンタクトプレート19とターミナル20とから構成され、帽子状のコンタクトプレート19の外周面に略中間部を屈曲させたターミナル20の一端を溶接により接続されている。

そして、アイソレーションブッシュ15、16内にてセンサ素子11の後端部11cとコンタクトプレート19のフランジ19aとがアイソレーションブッシュ15の下端により押圧接触させられ、ターミナル20の屈曲部20aの頂部は

、アイソレーションブッシュ16の内周面16aに当接している。そして、ターミナル20の先端部20bはアイソレーションブッシュ16の基端に設けられた貫通孔16bに挿入固定され、ターミナル20にバネ性が付与させるように構成される。

#### 【0013】

ここで、ターミナル20の原形は、図2に示されるように、その先端部20bがコンタクトプレート19側の軸線Oに対して外に開いて傾斜するように形成されており、したがって、部品の組付にあたっては、アイソレーションブッシュ16の貫通孔16bへ先端部20bが軸線O側へ変形させることにより挿入されるため、ターミナル20にバネ性が付与され、図1のA点及びB点には $F_1$ 、 $F_2$ の力が作用することになる。

#### 【0014】

アイソレーションブッシュ15の上端には、もう一つのアイソレーションブッシュ16を上から嵌合させ、更に、ホルダー12の基端外周にかしめ固定した円筒状のキャップ14により皿バネ21を介して該アイソレーションブッシュ15、16を固定している。

そして、アイソレーションブッシュ16の貫通孔16bより突出したターミナル20の先端部20bと一端を圧着接続されたリードハーネス17は、その他端をキャップ14の後端部に設けられたラバー22の孔を介して外部に導出されている。

#### 【0015】

尚、酸素センサーには、車両の振動により実際約 $300\text{ m/s}^2$ の加速度がかかることになるが、ここでは、安全をみて約 $1000\text{ m/s}^2$ かかるとすると、センサ出力端子16の重量は、約1gであるので、

$$0.001\text{ kg} \times 1000\text{ m/s}^2 = 1\text{ N}$$

の力がセンサ出力端子17に作用することになる。

#### 【0016】

したがって、この外力を緩和させることができるバネの弾性力がセンサ出力端子17のターミナル20に付与されている。



このように、ターミナル20にバネ性を持たせ、車両の振動に基づく横方向に作用する外力に対して該バネ部分で緩衝させることができるため、ターミナル20との各接続部に作用する外力が緩和され該接続部が破損することがなく、以て、酸素センサの信頼性を向上させることができると共に、ターミナル20をバネ部分でアイソレーションブッシュ16に固定することにより、組付時に落下することがないため、部品組付け作業における能率の向上が図られる。

#### 【 0 0 1 7 】

##### 【 考 案 の 効 果 】

以上説明したように、本考案によれば、ターミナルの略中央部を屈曲せしめ、該屈曲部の頂部をアイソレーションブッシュの内周面に当接させると共に、ターミナルの先端部をアイソレーションブッシュの貫通孔に挿入固定することにより、ターミナルにバネ性を持たせ、横方向に作用する外力に対して該バネ部分で緩衝させることができ、したがって、ターミナルとの各接続部に作用する外力が緩和され、以て、該接続部が破損することがないため、酸素センサの信頼性を向上させることができる。

#### 【 0 0 1 8 】

また、ターミナルをバネ部分でアイソレーションブッシュに固定することを可能とし、組付時に落下することがないため、部品組付け作業における能率の向上が図られる。